Bennett et al NGC doc. 12-1130

AMENDMENTS TO THE CLAIMS of SN 10/632,152

Please amend the claims as follows:

1(currently amended). A ceramic substrate for bonding to and supporting at least one electrically conductive trace for conduction of DC current and at least one electrically conductive trace for conduction of RF current in a microelectronic module, comprising:

a ceramic body having first and second side surfaces, with said first side surface overlying said second side surface;

said first side surface possessing a physical characteristic more favorable to adherence of a conductive trace for conduction of RF current than is said second side surface and said second side surface possessing a physical characteristic more favorable to adherence of conductive trace for conduction of DC current than is said first side surface;

a first conductive trace adhering to said first side surface for conduction of RF current;

a second conductive trace adhering to said second side surface for conduction of DC current;

said ceramic body including a plurality of layers of sintered dielectric material fused together to form a one-piece assembly, one of said plurality of layers comprising an outer layer to said ceramic body and defining said first side surface and another one of said layers comprising an outer layer to said ceramic body and defining said second side surface to said ceramic body;

said one of said plurality of layers comprising a first vitrified composition of powdered ceramic material, binder and other dielectric material;

said powdered ceramic material of said first vitrified composition comprising a first predetermined percentage by weight of said first vitrified composition;

said another one of said plurality of layers comprises a second vitrified composition of said powdered ceramic material, binder and other dielectric material; and

said powdered ceramic material in said second vitrified composition comprising a second predetermined percentage by weight of said second vitrified composition, said second predetermined percentage being less than said first predetermined percentage.

2(original). The ceramic substrate as defined in claim 1, wherein said powdered ceramic material comprises Aluminum Oxide.

3(original). The ceramic substrate as defined in claim 2, wherein each of said first and second sides is flat.

4(original). The ceramic substrate as defined in claim 1, wherein said plurality of layers comprises at least two.

5(currently amended). A ceramic substrate for bonding to and supporting at least one electrically conductive trace for conduction of DC current and at least one electrically conductive trace for conduction of RF current in a microelectronic module, comprising:

a ceramic body having first and second side surfaces, with said first side surface overlying said second side surface;

said first side surface possessing a physical characteristic more favorable to adherence of a conductive trace for conduction of RF current than is said second side surface and said second side surface possessing a physical characteristic more favorable to adherence of conductive trace for conduction of DC current than is said first side surface;

said ceramic body including a plurality of layers of sintered dielectric material, one of said plurality of layers comprising an outer layer to said ceramic body and defining said first side surface and another one of said layers comprising an outer layer to said ceramic body and defining said second side surface to said ceramic body;

said one of said plurality of layers comprising a first vitrified composition of powdered ceramic material, binder and other dielectric material;

said powdered ceramic material of said first vitrified composition comprising a first predetermined percentage by weight of said first vitrified composition and comprising Aluminum Oxide;

said another one of said plurality of layers comprises a second vitrified composition of said powdered ceramic material, binder and other dielectric material; and

said powdered ceramic material in said second vitrified composition comprising a second predetermined percentage by weight of said second vitrified composition and comprising Aluminum Oxide, said second predetermined percentage being less than said first predetermined percentage ~~The ceramic substrate as defined in claim 2~~, and wherein said first predetermined percentage is 99.6 per cent and wherein said second predetermined percentage is 96 per cent.

6(original). The ceramic substrate as defined in claim 5, wherein said plurality comprises at least two.

7(currently amended). A non-metallic electrically nonconductive ceramic substrate for an electronic module, said ceramic substrate having multiple layers fused together to form a one piece assembly, first and second opposed side surfaces and being of a predetermined thickness, said first surface being of a ceramic composition that is optimal in physical characteristic for bonding to a thin film conductor and said second surface being of a composition that is optimal in physical characteristic for bonding to a thick film conductor, said latter composition being different than said former composition; a first thin film conductor adhering to said first side surface for conduction of RF current; and a second thin film conductor adhering to said second side surface for conduction of DC current.

8(currently amended). A non-metallic electrically nonconductive ceramic substrate for an electronic module, said ceramic substrate having first and second opposed side surfaces and being of a predetermined thickness, said first surface being of a ceramic composition that is optimal in physical characteristic for bonding to a thin film conductor and said second surface being of a composition that is optimal in physical characteristic

for bonding to a thick film conductor, said latter composition being different than said former composition, ~~The ceramic substrate as defined in claim 7, wherein~~ said ceramic composition that is optimal in physical characteristic for bonding to a thin film conductor comprises aluminum oxide and binder in which said aluminum oxide constitutes 99.6% by weight of said composition; and ~~wherein~~ said composition that is optimal in physical characteristic for bonding to a thick film conductor comprises aluminum oxide and binder in which said aluminum oxide constitutes 96% by weight of said composition.

9(original). In an microelectronic module a substrate for supporting electronic devices and interconnects, said substrate having upper and lower sides and comprising first and second layers fused together to form an integral assembly, said first layer defining a flat surface to said upper side and said second layer defining a flat surface to said lower side, said first layer further comprising a first fused mixture of aluminum oxide power and binder in which said aluminum oxide powder in said first fused mixture comprises 99.6 % by weight of said first fused mixture, and said second layer further comprising a second fused mixture of aluminum oxide powder and binder in which said aluminum oxide powder in said second fused mixture comprises 96% by weight of said second fused mixture; a thin film conductor deposited on and attached to said upper side; and a thick film conductor plated on and attached to said lower side.

10 (withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module, comprising the steps of:

forming a first layer of a first composition of ceramic material and binder;

forming a second layer of a second composition of said ceramic material and binder over said first layer;

heating said first and second layers to fuse said ceramic material and binder of said first layer and of said second layer and to fuse said first and second layers together to form a one-piece unitary assembly; and

cooling said one-piece unitary assembly.

11(withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 10, wherein said step of forming a first layer of a first composition of ceramic material and binder includes the steps of:

preparing a first slurry of ceramic material and binder in said first composition, skiving said first slurry onto a carrier tape and drying said first slurry to form a first green tape on said carrier tape; and

wherein said step of forming a second layer of a second composition of said ceramic material and binder over said first layer, includes the steps of :

preparing a second slurry of said ceramic material and binder in said second composition, skiving said second slurry onto said first green tape and drying said second slurry to form a composite green tape on said carrier tape.

12 (withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 11, further including the step of removing said composite green tape from said carrier film following said step of drying said second slurry.

13 (withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 12, wherein one of said first and second compositions of ceramic and binder comprises 96% alumina and the remainder binder and wherein the other of said first and second compositions comprises 99.6% alumina and the remainder binder.

14(withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 13, further comprising the step of grinding and lapping said one piece unitary assembly.

15(withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 10, further comprising the step of grinding and lapping said one piece unitary assembly.

16(withdrawn). The method of manufacturing a dielectric ceramic substrate for a microelectronic module as defined in claim 15, further comprising the steps of forming a thick film conductor on said one of said surfaces and forming a thin film conductor on said other one of said surfaces.